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**TRANSMITTAL LETTER TO THE UNITED STATES
 DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING
 UNDER 35 U.S.C. 371**

U.S. APPLICATION NO.
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INTERNATIONAL APPLICATION NO

PCT/EP99/04518

INTERNATIONAL FILING DATE

30 June 1999

PRIORITY DATE CLAIMED

30 June 1999

TITLE OF INVENTION

Method and Device for Handling a Multimedia Call

APPLICANT(S) FOR DOMESTIC

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Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

- [x] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
- [] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371
- [x] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
- [x] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
- [x] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. [x] is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. [x] has been transmitted by the International Bureau.
 - c. [] is not required, as the application was filed in the United States Receiving Office (RO/US)
- [] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
- [x] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. [x] are transmitted herewith (required only if not transmitted by the International Bureau). (See Reply to Written Opinion).
 - b. [] have been transmitted by the International Bureau.
 - c. [] have not been made; however, the time limit for making such amendments has NOT expired.
 - d. [] have not been made and will not be made.
- [] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- [x] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). **Unexecuted**
- [x] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. Below concern other document(s) or information included:

- 11. [x] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
- 12. [] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
- 13. [] A **FIRST** preliminary amendment.
 - [] A **SECOND** or **SUBSEQUENT** preliminary amendment.
- 14. [] A substitute specification.
- 15. [] A change of power of attorney and/or address letter.
- 16. [x] Other items or information (*specify*): PCT Publication Sheet, Int'l Preliminary Examination Report, PCT Request, Written Opinion, Reply to Written Opinion, Information Concerning Elected Offices Notified of Their Election, Notice Informing the Applicant of the Communication of the International Application to the Designated Offices, Notice of the Recording of a Change, and Notification of Receipt of Record Copy

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INTERNATIONAL APPLICATION NO
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17.[x]The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the EPO or JPO\$890.00
 International preliminary examination fee paid to USPTO (37 CFR 1.482).....\$710.00
 No international preliminary examination fee paid to USPTO (37 CFR 1.482)
 but international search fee paid to USPTO (37 CFR 1.445(a)(2)).....\$740.00
 Neither international preliminary examination fee (37 CFR 1.482)
 nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO\$1040.00
 International preliminary examination fee paid to USPTO (37 CFR 1.482)
 and all claims satisfied provisions of PCT Article 33(2)-(4)\$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT = \$ 890

Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [] 30 months
 from the earliest claimed priority date (37 CFR 1.492(e)).

Claims	Number Filed	Number Extra	Rate	
Total Claims	33 - 20 =	13	x \$18.00	\$ 234
Independent Claims	6 - 3 =	2	x \$84.00	\$ 168
Multiple dependent claim(s) (if applicable)			+ \$280.00	\$

TOTAL OF ABOVE CALCULATIONS = \$ 1292

Reduction of ½ for filing by small entity, if applicable.

SUBTOTAL = \$ 1292

Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30
 months from the earliest claimed priority date (37 CFR 1.492(f)).

TOTAL NATIONAL FEE = \$ 1292

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
 accompanied by the appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property
 +

TOTAL FEES ENCLOSED \$1292

Amount to be refunded: \$

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a. [x] One check in the amount of \$ 1292 to cover the above fees is enclosed.

b. [] Please charge my Deposit Account No. 03-2412 in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [x] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 03-2412. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive
 (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO

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METHOD AND DEVICE FOR HANDLING A MULTIMEDIA CALLFIELD OF THE INVENTION

- 5 The present invention relates to a method for performing a communication between two terminal equipments via at least one communication network and also relates to a corresponding device and a corresponding system. In particular, the present invention is directed to a method
- 10 and a corresponding device and a corresponding system for handling a multimedia call in different communication networks.

BACKGROUND OF THE INVENTION

- 15 In recent and future communication systems the ability to perform a multimedia call becomes more and more important. An example of such a multimedia call is a videotelephony call. Such kind of communication requires e.g. high data
- 20 transfer rates and a high quality of service (QoS) level. Therefore, specific services and equipment are to be defined.

- Telecommunication systems and networks being adapted to
- 25 perform a videotelephony call are for example the Integrated Services Digital Network (ISDN), General Packet Radio Service (GPRS) in the Global System for Mobile communication (GSM) or the Universal Mobile Telecommunications System (UMTS). Furthermore, in combination with a
- 30 respective system, it is possible to use a circuit switched communication or a packet data communication.

- For defining a multimedia communication several recommendations for example by the International
- 35 Telecommunications Union (ITU) have been made, e.g. the

H.245, the H.324 and the like, which describe services, protocols, terminals etc. to be used for a multimedia call such as a videocall.

- 5 In the case of the above mentioned videocall, it is possible to transfer data between two terminals (mobile or fixed) via a communication network of one of the above mentioned types. The terminals or terminal equipments (such as mobile stations or videotelephones) can be in the same communication network or in different communication networks. The videocall is performed via a bi-directional connection between the two terminal equipments. Said connection initiated by one of said terminal equipments is for example an end-to-end H.324 connection which is carried for example on a UMTS data bearer.

- 10 In view of the high amount of data, the used network has to provide a corresponding high data transfer rate. Said data rate is also to be ensured for a data exchange between two different networks when the two terminal equipments are within respective different networks (for example UMTS -> ISDN, UMTS A -> UMTS B and the like).

- 15 However, there are some drawbacks. During a normal connection (e.g. packet data communication or circuit switched communication) between the two terminal equipments being in the same network such as a UMTS network, the quality of service (i.e. of the connection) can get worse and a good or even adequate communication can not be guaranteed. Moreover, when a handover is to be made for at least one of the terminal equipments from a network adapted to perform a videocall such as a UMTS network to a network with lower capacity (and therefore for example not able to perform a videocall) where such high data rates used for a multimedia call are not supported, the connection is interrupted. In the case that the lower capacity network

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handed over to is able to perform a videocall, at least the quality of service is getting worse.

- Document EP-A-0 841 763 A1 describes a method of
5 controlling physical radio resources.

Furthermore, in document WO-A-97/09810, a method for multirate data communications in one communication network is described.

10

SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide a method and a corresponding device for handling a
15 multimedia call such as a videocall in different communication networks, which are free from the above mentioned drawbacks. Furthermore, a corresponding device is to be provided.

- 20 According to the present invention, this object is achieved by a method for performing a communication between two terminal equipments, said method comprising the steps of establishing a first connection for a communication signal between the two terminal equipments via a first
25 communication network, characterized by the steps of detecting a connection changing condition, said changing condition being a handover of one of said terminal equipments to a second communication network having lower communication resources, and, if said connection changing
30 condition is detected, dividing said communication signal at least into a first signal component and a second signal component, at least said second signal component being suitable for transmission in said second communication network and establishing at least one second connection
35 between said terminal equipments, said second signal

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component being transmitted via said second connection to said one of said terminal equipments.

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- 5 Additionally, this object is achieved, for example, by a method for performing a packet data multimedia communication between two terminal equipments, said method comprising the steps of establishing at least a first connection and a second connection for communication signal components between the two terminal equipments via a first
- 10 communication network, characterized by the steps of detecting a connection changing condition, said changing condition being a handover of one of said terminal equipments to a second communication network having lower communication resources, and, if said connection changing
- 15 condition is detected, canceling one of said at least first and second connections transmitting one communication signal component and maintaining the connection via the other one of said at least first and second connections transmitting the other signal component, wherein said other
- 20 signal component is suitable for transmission in said second communication network.

- Furthermore, the present invention proposes a device for performing a communication between two terminal equipments,
- 25 said device comprising first establishing means for establishing a first connection for a communication signal between the two terminal equipments via a first communication network, characterized by comprising detecting means for detecting a connection changing
- 30 condition, said changing condition being a handover of one of said terminal equipments to a second communication network having lower communication resources, dividing means for dividing said communication signal at least into a first signal component and a second signal component, if
- 35 said detecting means detects said connection changing condition, at least said second signal component being

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suitable for transmission in said second communication network, and second establishing means for establishing at least one second connection between said terminal equipments, said second signal component being transmitted
5 via said second connection to said one of said terminal equipments.

10 Additionally, the present invention proposes a device for performing a packet data multimedia communication between two terminal equipments, said device comprising establishing means for establishing at least a first connection and a second connection for communication signal components between the two terminal equipments via a first communication network, characterized by comprising
15 detecting means for detecting a connection changing condition, said changing condition being a handover of one of said terminal equipments to a second communication network having lower communication resources, and canceling means for canceling one of said at least first and second
20 connections transmitting one communication signal component while maintaining the connection via the other one of said at least first and second connections transmitting the other signal component, wherein said other signal component is suitable for transmission in said second communication
25 network.

Moreover, the present invention proposes a system in which a communication between two terminal equipments is performed, said system is adapted to establish a first
30 connection for a communication signal between the two terminal equipments via a first communication network, characterized in that the system is adapted to detect a connection changing condition, said changing condition being a handover of one of said terminal equipments to a
35 second communication network having lower communication resources, and, if said connection changing condition is

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- detected, divide said communication signal at least into a first signal component and a second signal component, at least said second signal component being suitable for transmission in said second communication network and
- 5 establish at least one second connection between said terminal equipments, said second signal component being transmitted via said second connection to said one of said terminal equipments.
- 10 Additionally, the present invention proposes a system in which a packet data multimedia communication between two terminal equipments is performed, said system being adapted to establish at least a first connection and a second connection for communication signal components between the
- 15 two terminal equipments via a first communication network, characterized in that said system is adapted to detect a connection changing condition, said changing condition being a handover of one of said terminal equipments to a second communication network having lower communication
- 20 resources, and, if said connection changing condition is detected, cancel one of said at least first and second connections transmitting one communication signal component and maintain the connection via the other one of said at least first and second connections transmitting the other
- 25 signal component, wherein said other signal component is suitable for transmission in said second communication network.
- Advantageous further developments of the present invention
- 30 are as set out in the respective dependent claims.

According to the present invention, the proposed method and/or device and/or system allow to establish at least one second connection between the two terminal equipments or

35 between a respective terminal equipment and a respective network, respectively. By using said second connection

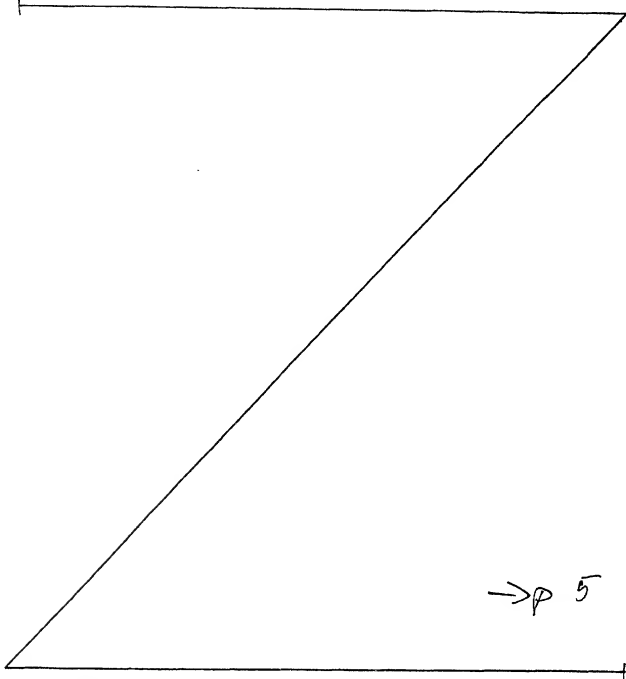
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parallel to the first one, it is possible to transmit one component (for example a video component) of the original communication signal via the first connection and another component (for example a speech component) of the original communication signal via the second connection.

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Advantageously, the video component can use the complete capacity of the first connection which improves the quality and robustness according for example H.324. On the other hand, the speech component transmitted via the second connection is not affected by the video component which

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also improves quality. Said second connection can be a connection similar to the first one (e.g. a UMTS multimedia call connection) or just a (lower capacity) speech call connection. It is also possible to use both connection as a data bearer and split and combine the data as it seems fit between the two connections.

Additionally, in case of a handover, in particular in a handover to a network with lower capacity or which is unable to perform a videocall (for example some GSM networks), by dropping the video component (i.e. the corresponding connection), the multimedia call or at least the speech call can be maintained. In case of a connection between e.g. a UMTS network and a GSM network each using different protocol types, the speech component can be easily transcoded by a corresponding element. At a handover back to the UMTS network, the multimedia call can be reestablished in the original way.

Preferred embodiments of the invention are described herein below in detail by way of example with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

25

FIGS. 1A, 1B and 1C show connection states between two terminals.

FIGS. 2A, 2B show connection paths with elements used in a communication according to the invention.

FIG. 3 is a flowchart illustrating a method for handling a communication according to the invention.

FIG. 4 is a flowchart illustrating a method for handling a communication according to the invention.

FIG. 5 is a flowchart illustrating a method for handling a communication according to the invention.

- 5 FIG. 6 is a block circuit diagram for illustrating a device for handling a communication according to the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

- 10 In FIG. 1A a connection state for a multimedia call in a most general case is shown. A first terminal equipment TE 1 is connected to a second terminal equipment TE 2 via a communication network NW 1. Said network is for example an UMTS network adapted to perform a multimedia communication.
- 15 Through the connection a multimedia signal V/S (e.g. a videotelephony call) is transmitted between said terminal equipments.

- FIG. 1B illustrates one implementation of the present invention. In this case, for example the quality of the communication connection within the network NW 1 is getting worse. Therefore the original multimedia signal V/S is divided into at least two components V and S each of which transmitted via a separate connection. The at least one new
- 25 connection is established similar to the original connection. It is either of the same type (for example an UMTS multimedia call connection) or of a different type (for example a normal speech call connection). The selection of the connection type used for the second
- 30 connection can be made subscriber specific, dependant on network resources available or fixed (i.e. always the same type such as the above mentioned UMTS connection).

- The two signal components V and S can be of the same type
- 35 (split and combine the data stream of the original signal V/S in accordance with network requirements), i.e. the

connections are used as similar data bearers. On the other hand, there can be formed different component types such as video and speech component.

- 5 Optionally, the first connection transmitting for example the video signal component V from the network NW 1 to the second terminal equipment TE 2 can be canceled depending on network resources.
- 10 The above described case is also possible when the two terminal equipments are within different networks both of them adapted to perform a multimedia call on the same level. It is obvious, that corresponding connections are to be established between the networks in such a case.
- 15 It is to be noted, that for deciding whether a second connection (or even more connections) is to be established e.g. because of a deterioration of quality the connection is to be monitored. This monitoring can be done either by
- 20 the network (e.g. by a mobile switching center MSC) and/or by the terminal equipment. Also the decision of the establishment of said second connection can be made by either the network or the terminal equipment.
- 25 In FIG. 1C another implementation of the present invention is shown. Here, a case of a handover to a second network NW 2, i.e. the second terminal equipment TE 2 is moved into a coverage area of said second network, is described. The second network NW 2 is for example a GSM network which has
- 30 not adequate resources for transmitting such a high amount of data as used in a multimedia call. Therefore, when recognizing this circumstances, after establishing the second connection and dividing the original multimedia signal V/S into the two components V and S, the first
- 35 connection and hence the first (video) component is dropped. Only the second component S, for example the

speech component, is forwarded (or handed over) by the first network to the second user equipment. Here, in particular in a circuit switched type connection, when one component is dropped (e.g. the video component V), it can be necessary to notify this change in communication to the terminal equipments TE1, TE2 to guarantee an uninterrupted communication.

In this case, it is also possible that the format of the multimedia signal, i.e. the format of the second signal component S, is to be changed in accordance with the respective second network NW 2 such as a GSM network. For example, when the first network NW 1 uses H.324, the corresponding signal component S is to be transcoded for the second network NW 2.

In the above described cases (FIG. 1B, 1C), when the reason for the establishment of the second connection and the division of the multimedia signal V/S (i.e. a changing condition) is not present anymore, for example due to a back-handover from a GSM network to a UMTS network, the original connection state (one connection, one signal V/S) can be reestablished. However, it is also possible to maintain the two connections.

It should be noted, that it is also possible, e.g. in the case of a packet data transfer, that only a part of the data packets with corresponding contents will be transferred via the communication connection according to the present invention.

In the following, with reference to FIG. 2A and 2B, connection paths and specific network elements used therein in case of the above described handover are illustrated. It is to be noted, that here the paths are shown in the direction from the lower capacity network to the higher

capacity network. However, it is easy to understand that the same procedure is executed in the opposite direction.

In FIG. 2A one example of a connection according to the present invention is shown, in particular in case of a handover to a lower capacity network. This type of handover requires a videocodec/speech codec (encoder/decoder) adapter in the connection path. The situation before said handover is as shown in FIG. 1A. After the handover, as illustrated in FIG 2A, the connection is as follows. The signals are forwarded from a terminal equipment TE 1 via an advanced multirate speech coder AMR to a transcoder. The AMR is a new type of speech coder used for GSM systems, which is adapted to vary its coding rate in accordance with the data (speech) to be transmitted. The transcoder is adapted to encode and decode for example the speech signal into corresponding data formats. The data is then transmitted to a network element of the (second) network NW 2, for example to a mobile switching center MSC. Here, a pulse code modulation PCM is used as a coding method for transmitting data such as speech via the networks. One method used for coding is for example A-law. Then, the data is forwarded to another network NW 1 via a gateway 1. Said gateway is also a transcoder used for changing the format of the data from the PCM A-law format into another format, for example a H.324 format. Optionally, a further advanced multirate speech coder can be introduced. Via the network NW 2 (for example a network applicable according to H.324) data is transmitted to the called terminal equipment TE 2.

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FIG. 2B shows a similar case to FIG. 2A. Here, a tandemfree operation is supported, i.e. the transcoder is within the network itself. In contrast to the above described case with reference to FIG. 2A, the gateway 2 simply adapts the AMR speech signal format to a H.324 format, which can be also correspond to an AMR.

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As mentioned above, it is also possible to use the present invention in case of a deterioration of quality or to guarantee service continuity. For this application, it is
5 for example requested to switch off the video connection or video channel V, i.e. the corresponding data bearer. The speech component S (AMR speech) is for example encapsulated in a H.223 multiplexing protocol data stream. In this case, it is possible to reach a lower bit error rate and a higher
10 quality. Furthermore, also a dedicated speech service with AMR speech coding and the like can be requested.

With reference to FIG. 3, a method for performing a communication between the two terminal equipments TE1, TE2
15 according to the invention is described. When the procedure is started (step S1), first the first connection for the multimedia signal V/S between the two terminal equipments TE1, TE2 via the first communication network is established in step S2. When in step S3 a connection changing condition
20 (e.g. because of a deterioration of quality or due to a handover, as described above) is detected, the process proceeds to step S4, otherwise said step S3 is repeated.

In step S4, after detection of said connection changing
25 condition, the multimedia signal V/S is divided at least into a first signal component V and a second signal component S, which are in the case of a videotelephony call a video component and a speech component, respectively. Also, in step S5, at least one second connection is
30 established, either on request by a respective terminal equipment TE 1, TE 2 or by the network itself. Now the first signal component V may be transmitted via the first connection and the second signal component S may be transmitted via the second connection.

In a step S6, it is decided, whether the changing condition detected in said detecting step S3 is a handover to a lower capacity network. If YES, in step S7 the first connection including the transmitted first signal component V (for example the video component as the component requiring the most resources) is canceled. Furthermore, in step S8, the format of the still transmitted signal component S may be changed or transcoded, if required.

- 10 With reference to FIG. 4, in the following the case is described where the changing condition concerning a handover is canceled. When detecting in step S9 that e.g. the handover to a lower capacity network is finished and a handover to a higher capacity network (at least at an adequate capacity level to perform a multimedia call) is performed, in step S10 the first connection canceled in said canceling step S7 is reestablished. This reestablishment can be initiated by a terminal equipment TE 1, TE 2 or by the network (for example by the mobile switching center MSC). Now, the multimedia communication can be performed via the first connection transmitting the first signal component V and the second connection transmitting the second signal component S, as described above. However, it is also possible to recombine both components V and S to the original multimedia signal V/S (step S11). Then the second connection can be canceled or still used to transmit one part of said multimedia signal V/S split thereof.
- 30 With reference to FIGS. 3 and 5, now the case is described where no handover is to be performed but the changing condition detected in said detecting step S3 is for example a lack of quality.
- 35 In the above mentioned case, in step S13, the multimedia communication is performed by maintaining the first and the

second connection transmitting the first and the second signal component V, S. Similar to the above described handover, when the canceling of the changing condition is detected in step S14 in FIG. 4 (i.e. the quality can be guaranteed again or because of a user request), in step S15 the original multimedia signal V/S is rebuilt from the first signal component V and the second signal component S. The second connection is canceled in step S16 the rebuilt multimedia signal V/S is again transmitted via the first connection. Optionally, the second connection can be maintained, as described above, for transmitting one signal part.

In FIG. 6, a device 100 (V/S call device) adapted to perform a handling of a multimedia call in accordance with the present invention is shown. For said multimedia call, the first connection for a multimedia signal V/S between the two terminal equipments TE1, TE2 via the network is established by a connection establishing means 110. When a detecting means 120 detects a connection changing condition such as a handover to a lower capacity network or a deterioration of quality, a dividing means 130 divides said multimedia signal V/S at least into a first signal component V (for example a video component) and a second signal component S (for example a speech component). The establishing means 110 establishes at least one second connection, wherein said first signal component V may be transmitted via the first connection and said second signal component S may be transmitted via the second connection.

Additionally, a canceling means 140 is adapted to cancel the first connection transmitting the first signal component V, for example in the case of a handover to a lower capacity network NW2 as described above. Then the communication is performed only via the second connection transmitting the second signal component S.

A reestablishing means 150 is adapted to reestablish the first connection canceled by said canceling means 140, when said changing condition is dropped (detected for example by said detecting means 120). Now the communication may be performed via the first connection transmitting the first signal component V and the second connection transmitting the second signal component S. It is also possible, that the original multimedia signal V/S is rebuilt by a rebuilding means 160 from the first and the second signal component V and S. In this case, said communication may be performed via the first and second connection both transmitting one part of the multimedia signal V/S (for example split). Another solution is to cancel the second connection by said canceling means 140. Then the multimedia call is only performed via the first connection transmitting the rebuilt multimedia signal V/S.

In the case of a handover, when the lower capacity network uses for example a different protocol type, a changing means 170 is used for changing or transcoding the respective communication signal (for example the speech component S) from one format into the respective other format used in the respective networks NW 1, NW 2.

It should be noted, that the device 100 can be part of the corresponding networks and or of the terminal equipments.

As mentioned above, it is possible to maintain both parallel connections even if the changing condition is dropped. However, it should be mentioned, that this solution increases costs as more resources are required. Therefore, in general the second connection is only activated if required (low quality, preparation of handover or the like) and canceled when not needed anymore.

A user performing a call using the present invention will be charged according to the number (and/or capacity) of the currently established connections. However, when a connection or connections are for example handed over from one network (e.g. NW1) to another network (e.g. NW2), it is obvious that charging will be stopped in the first network and started in the second network handed over to. Conditions for the charge can be subscriber specific or according to usual network negotiations.

It may be possible to enhance current in-band negotiation protocols to handle the above described parallel call feature according to the present invention. The data bearer should be able to carry H.245 signaling.

The parallel (speech call) connection can be established for example before, during or after a handover, e.g. to a lower capacity network. Furthermore, the present invention can be used in a handover within for example one UMTS network (intra-UMTS handover), in a user initiated handover or in a user initiated change of connection type (bearer re-negotiation).

In particular, when the present invention is used in a packet data multimedia communication for example in a H.323 system, it is very easy to implement. Since in a H.323 system each multimedia signal component (e.g. speech and video) has own separate bearers (in uplink and downlink direction), a diversion of the components or even a switch off of one component (i.e. of the corresponding bearers) is easy to perform. This allows an improvement of quality or a continuation of the multimedia call, for example only by speech, when a lack of capacity of the used network as a changing condition occurs (e.g. due to a handover or other reasons, as described above). When the changing condition is dropped (e.g. handover back to the higher capacity

network or the like), it is also easy to reestablish the original communication paths only by switching on the previously cancelled bearers.

- 5 The present invention proposes a method for performing a communication between two terminal equipments TE1, TE2 via at least one communication network NW1, NW2, said method comprising the steps of establishing S2 a first connection for a communication signal V/S between the two terminal equipments, detecting S3 a connection changing condition, and, if said connection changing condition is detected, dividing S4 said communication signal at least into a first signal component V and a second signal component S and establishing S5 at least one second, said first signal component being transmitted via the first connection and said second signal component being transmitted via the second connection. The present invention proposes also a corresponding device 100 and a corresponding system.
- 10
- 15
- 20 It should be understood that the above description and accompanying figures are merely intended to illustrate the present invention by way of example only. The preferred embodiments of the present invention may thus vary within the scope of the attached claims.

Enclosure of August 8, 2001

PCT Patent Application No.: PCT/EP99/04518
NOKIA NETWORKS OY
Our ref.: WO 24391

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NEW CLAIMS 1 TO 33

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1. A method for performing a communication between two terminal equipments (TE1, TE2),

said method comprising the steps of:

establishing (S2) a first connection for a

15 communication signal (V/S) between the two terminal equipments (TE1, TE2) via a first communication network (NW1),

characterized by the steps of:

detecting (S3) a connection changing condition, said

20 changing condition being a handover of one of said terminal equipments (TE2) to a second communication network (NW2) having lower communication resources, and,

if said connection changing condition is detected, dividing (S4) said communication signal (V/S) at least into
25 a first signal component (V) and a second signal component (S), at least said second signal component being suitable for transmission in said second communication network (NW2) and

establishing (S5) at least one second connection

30 between said terminal equipments (TE1, TE2), said second signal component (S) being transmitted via said second connection to said one of said terminal equipments (TE2).

2. A method according to claim 1, further comprising the
35 steps of:

canceling (S7) the first connection transmitting the first signal component (V), and

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maintaining the communication via the second connection transmitting the second signal component (S).

3. A method according to claim 2, further comprising the
5 steps of:

reestablishing (S10) the first connection canceled in said canceling step (S7), when said changing condition is dropped (S9), and

- performing the communication via the first connection
10 transmitting the first signal component (V) and the second connection transmitting the second signal component (S).

4. A method according to claim 2, further comprising the steps of:

- 15 reestablishing (S10) the first connection canceled in said canceling step (S7), when said changing condition is dropped (S9),

rebuilding (S11) the communication signal (V/S) from the first signal component (V) and the second signal

- 20 component (S), and

performing the communication via the first connection transmitting the communication signal (V/S) rebuilt in said rebuilding step (S11).

- 25 5. A method according to claim 1, further comprising the steps of:

maintaining (S13) the communication via the first and the second connection transmitting the first and the second signal component (V, S),

- 30 rebuilding (S15) the communication signal (V/S) from the first signal component (V) and the second signal component (S),

canceling (S16) the second connection, and

- transmitting the rebuilt communication signal (V/S)
35 via the first connection.

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6. A method according to claim 1, wherein said communication signal (V/S) is a videotelephony signal.

5 7. A method according to claim 6, wherein said first signal component (V) is a video signal component and said second signal component (S) is a speech component.

8. A method according to claim 1, wherein said handover is
10 performed when at least one of said terminal equipments (TE1, TE2) leaves a communication area of a first communication network (NW1) and enters a communication area of a second communication network (NW2).

15 9. A method according to claim 8, wherein communication signals of a first format are used in said first communication area (NW1) and communication signals of a second format are used in said second communication area (NW2),

20 said method further comprising the step of changing (S8) the communication signal (V/S) or the first signal component (V) or the second signal component (S) from one of said first or second format into the respective other of the first or second format.

25 10. A method for performing a packet data multimedia communication between two terminal equipments (TE1, TE2), said method comprising the steps of:
establishing at least a first connection and a second
30 connection for communication signal components (V, S) between the two terminal equipments (TE1, TE2) via a first communication network (NW1),
characterized by the steps of:
detecting a connection changing condition, said
35 changing condition being a handover of one of said terminal

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equipments (TE2) to a second communication network (NW2) having lower communication resources, and,

if said connection changing condition is detected, canceling one of said at least first and second connections transmitting one communication signal component (V) and maintaining the connection via the other one of said at least first and second connections transmitting the other signal component (S), wherein said other signal component (S) is suitable for transmission in said second communication network (NW2).

11. A method according to claim 10, further comprising the steps of:

reestablishing the connection canceled in said canceling step, when said changing condition is dropped, and

performing the communication via the at least first and second connections transmitting the communication signal components (V, S).

12. A device for performing a communication between two terminal equipments (TE1, TE2),

said device (100) comprising:

first establishing means (110) for establishing a first connection for a communication signal (V/S) between the two terminal equipments (TE1, TE2) via a first communication network (NW1),

characterized by comprising:

detecting means (120) for detecting a connection changing condition, said changing condition being a handover of one of said terminal equipments (TE2) to a second communication network (NW2) having lower communication resources,

dividing means (130) for dividing said communication signal (V/S) at least into a first signal component (V) and

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a second signal component (S), if said detecting means (120) detects said connection changing condition, at least said second signal component being suitable for transmission in said second communication network (NW2),

5 and

second establishing means (110) for establishing at least one second connection between said terminal equipments (TE1, TE2), said second signal component (S) being transmitted via said second connection to said one of
10 said terminal equipments (TE2).

13. A device (100) according to claim 12, comprising canceling means (140) for canceling the first connection transmitting the first signal component (V),
15 said communication being maintained via the second connection transmitting the second signal component (S).

14. A device according to claim 13, comprising reestablishing means (150) for reestablishing the
20 first connection canceled by said canceling means (140), when said changing condition is dropped, said communication being performed via the first connection transmitting the first signal component (V) and the second connection transmitting the second signal component (S).

25

15. A device (100) according to claim 13, comprising reestablishing means (150) for reestablishing the first connection canceled by said canceling means (140), when said changing condition is dropped, and
30 rebuilding means (160) for rebuilding the communication signal (V/S) from the first and the second signal component (V, S), said communication being performed via the first connection transmitting the communication signal (V/S) rebuilt by said rebuilding means (160).

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16. A device according to claim 12, wherein the communication is maintained via the first and the second connection transmitting the first and the second signal component (V, S),

5 said device (100) comprising
 rebuilding means (160) for rebuilding the communication signal (V/S) from the first and the second signal component (V, S),

 canceling means (140) for canceling the second
10 connection, said communication being performed via the first connection transmitting the communication signal (V/S) rebuilt by said rebuilding means (160).

17. A device according to claim 12, wherein said
15 communication signal (V/S) is a videotelephony signal.

18. A device according to claim 17, wherein said first signal component (V) is a video signal component and said second signal component (S) is a speech component.

20
19. A device according to claim 12, wherein said handover is performed when at least one of said terminal equipments (TE1, TE2) leaves a communication area of a first communication network (NW1) and enters a communication area
25 of a second communication network (NW2).

20. A device according to claim 19, wherein communication signals of a first format are used in said first communication area (NW1) and communication signals of a
30 second format are used in said second communication area (NW2),

 said device (100) comprising
 changing means (170) for changing the communication signal (V/S) or the first signal component (V) or the
35 second signal component (S) from one of said first or

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second format into the respective other of the first or second format.

21. A device for performing a packet data multimedia

5 communication between two terminal equipments (TE1, TE2),
said device comprising:

establishing means for establishing at least a first
connection and a second connection for communication signal
components (V, S) between the two terminal equipments (TE1,
10 TE2) via a first communication network (NW1),
characterized by comprising:

detecting means for detecting a connection changing
condition, said changing condition being a handover of one
of said terminal equipments (TE2) to a second communication
15 network (NW2) having lower communication resources, and

canceling means for canceling one of said at least
first and second connections transmitting one communication
signal component (V) while maintaining the connection via
the other one of said at least first and second connections
20 transmitting the other signal component (S), wherein said
other signal component (S) is suitable for transmission in
said second communication network (NW2).

22. A device according to claim 21, further comprising:

25 reestablishing means for reestablishing the connection
canceled by said canceling means, when said changing
condition is dropped, said packet data communication being
performed via the at least first and second connections
transmitting the communication signal components (V, S).
30

23. A system in which a communication between two terminal
equipments (TE1, TE2) is performed,

said system is adapted to:

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establish (S2) a first connection for a communication signal (V/S) between the two terminal equipments (TE1, TE2) via a first communication network (NW1),

characterized in that the system is adapted to
5 detect (S3) a connection changing condition, said changing condition being a handover of one of said terminal equipments (TE2) to a second communication network (NW2) having lower communication resources, and,

if said connection changing condition is detected,
10 divide (S4) said communication signal (V/S) at least into a first signal component (V) and a second signal component (S), at least said second signal component being suitable for transmission in said second communication network (NW2) and

15 establish (S5) at least one second connection between said terminal equipments (TE1, TE2), said second signal component (S) being transmitted via said second connection to said one of said terminal equipments (TE2).

20 24. A system according to claim 23, further adapted to: cancel (S7) the first connection transmitting the first signal component (V), and

maintain the communication via the second connection transmitting the second signal component (S).

25

25. A system according to claim 24, further adapted to: reestablish (S10) the canceled first connection, when said changing condition is dropped (S9), and

perform the communication via the first connection
30 transmitting the first signal component (V) and the second connection transmitting the second signal component (S).

26. A system according to claim 24, further adapted to:

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reestablish (S10) the first connection canceled in said canceling step (S7), when said changing condition is dropped (S9),

rebuild (S11) the communication signal (V/S) from the
5 first signal component (V) and the second signal component (S), and

perform the communication via the first connection transmitting the communication signal (V/S) rebuilt in said rebuilding step (S11).

10

27. A system according to claim 23, further adapted to:

maintain (S13) the communication via the first and the second connection transmitting the first and the second signal component (V, S),

15

rebuild (S15) the communication signal (V/S) from the first signal component (V) and the second signal component (S),

cancel (S16) the second connection, and

transmit the rebuilt communication signal (V/S) via

20

the first connection.

28. A system according to claim 23, wherein said communication signal (V/S) is a videotelephony signal.

25

29. A system according to claim 28, wherein said first signal component (V) is a video signal component and said second signal component (S) is a speech component.

30. A system according to claim 23, further adapted to
30 perform said handover when at least one of said terminal equipments (TE1, TE2) leaves a communication area of a first communication network (NW1) and enters a communication area of a second communication network (NW2).

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31. A system according to claim 30, wherein communication signals of a first format are used in said first communication area (NW1) and communication signals of a second format are used in said second communication area (NW2),

5 said system is adapted to
 change (S8) the communication signal (V/S) or the first signal component (V) or the second signal component (S) from one of said first or second format into the
10 respective other of the first or second format.

32. A system in which a packet data multimedia communication between two terminal equipments (TE1, TE2) is performed,

15 said system being adapted to:
 establish at least a first connection and a second connection for communication signal components (V, S) between the two terminal equipments (TE1, TE2) via a first communication network (NW1),

20 characterized in that said system is adapted to
 detect a connection changing condition, said changing condition being a handover of one of said terminal equipments (TE2) to a second communication network (NW2) having lower communication resources, and,

25 if said connection changing condition is detected,
 cancel one of said at least first and second connections transmitting one communication signal component (V) and maintain the connection via the other one of said at least first and second connections transmitting the other signal
30 component (S), wherein said other signal component (S) is suitable for transmission in said second communication network (NW2).

33. A system according to claim 32, further adapted to:

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reestablish the connection canceled in said canceling
step, when said changing condition is dropped, and
perform the communication via the at least first and
second connections transmitting the communication signal
5 components (V, S).

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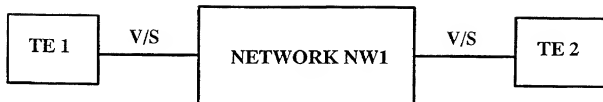


FIG. 1A

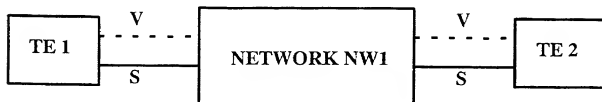


FIG. 1B

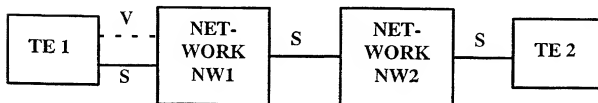


FIG. 1C

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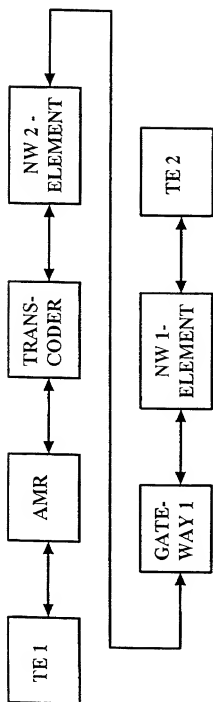


FIG. 2A

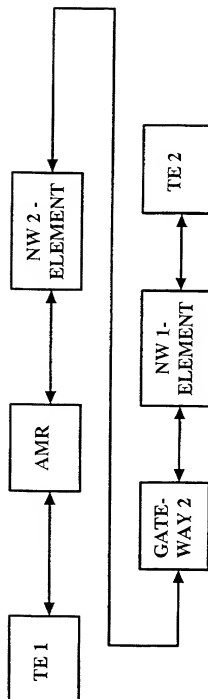


FIG. 2B

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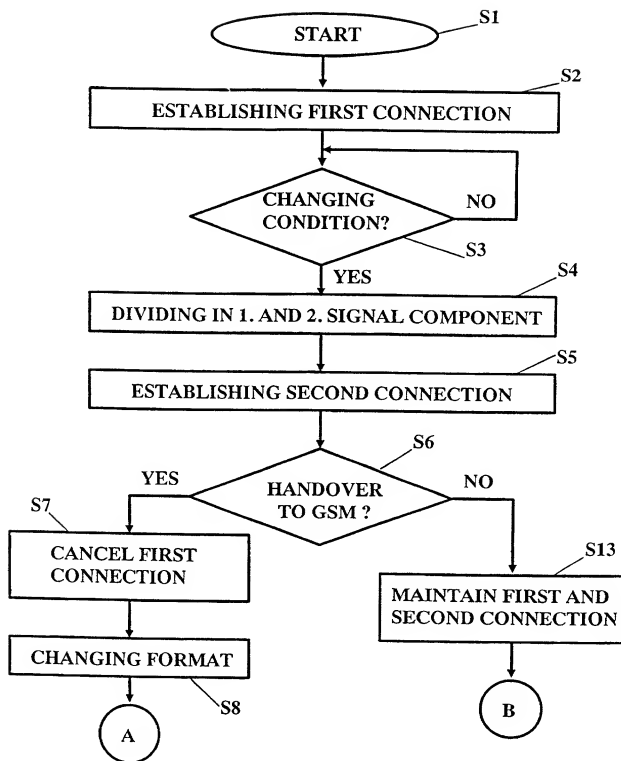


FIG.3

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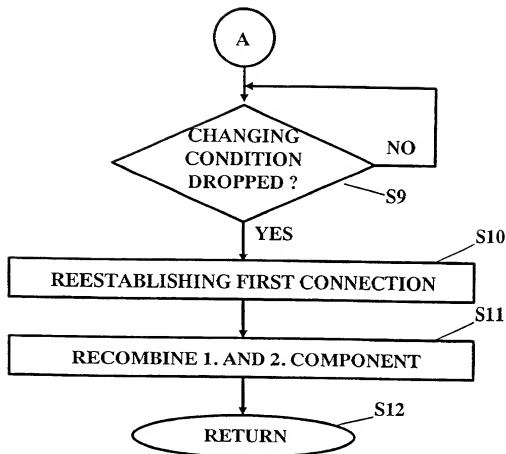


FIG.4

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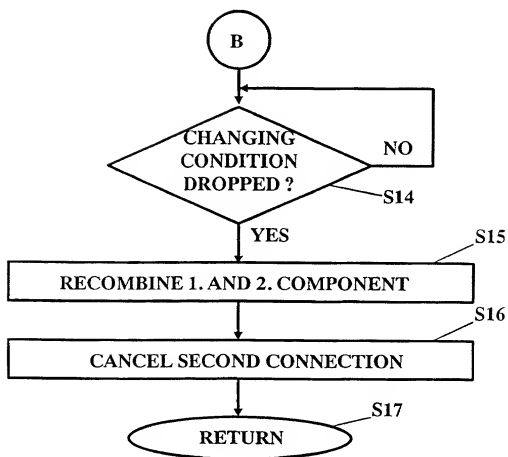


FIG.5

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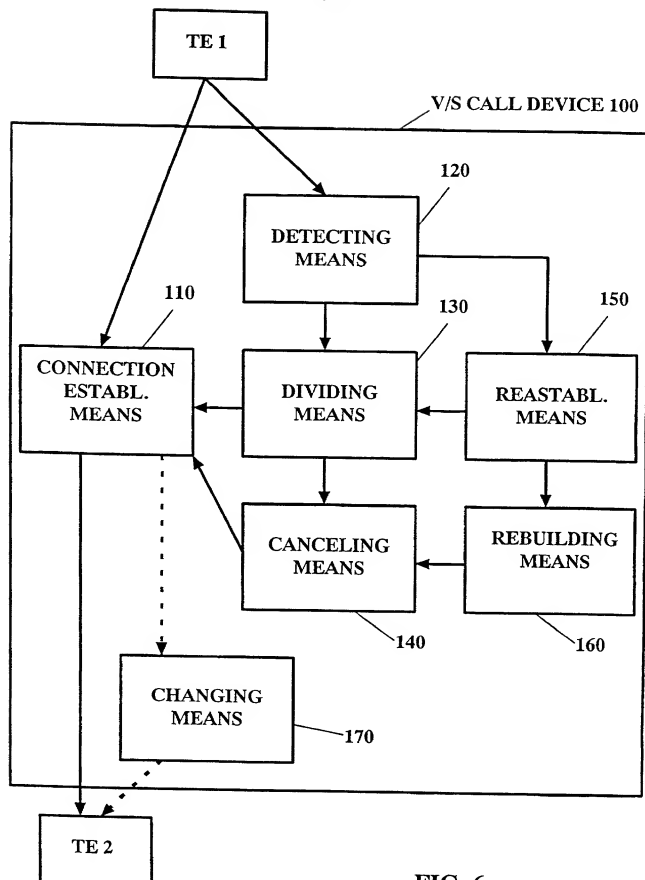


FIG. 6

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
Includes Reference to PCT International Applications

Attorney's Docket No.
4925-185PUS

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND DEVICE FOR HANDLING A MULTIMEDIA CALL

the specification of which (check only one item below)

☐ is attached hereto

☐ was filed as United States application

Serial No. _

on _

and was amended

on _ (if applicable).

☒ was filed as PCT international application

Number PCT/EP99/04518

on 30 June 1999

and was amended under PCT Article 19

on _ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of the application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

PRIOR FOREIGN/PCT APPLICATIONS AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

Country (if PCT, indicate "PCT")	Application Number	Date of Filing (day, month, year)	Priority Claimed Under 35 U.S.C. 119	
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
PCT	PCT/EP99/04518	30 June 1999	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO

Combined Declaration for Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

Attorney's Docket No.
4925-18SPUS

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		
PCT/EP99/04518	30 June 1999		X	

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (*List name and registration number*)

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Attorney's Docket No
4925-185PUS

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	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY									
2006	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME									
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP									
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY									
2007	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME									
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP									
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY									
2008	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME									
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP									
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY									
2009	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME									
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP									
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY									

Combined Declaration for Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

Attorney's Docket No.
4925-185PUS

2 1 0	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
2 1 1	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
2 1 2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201 <i>[Signature]</i>	SIGNATURE OF INVENTOR 202 <i>[Signature]</i>	SIGNATURE OF INVENTOR 203 <i>[Signature]</i>
DATE <i>1-21-02</i>	DATE <i>1/10/2002</i>	DATE <i>2/5/2002</i>
SIGNATURE OF INVENTOR 204 <i>[Signature]</i>	SIGNATURE OF INVENTOR 205	SIGNATURE OF INVENTOR 206
DATE <i>2/5/2002</i>	DATE	DATE
SIGNATURE OF INVENTOR 207	SIGNATURE OF INVENTOR 208	SIGNATURE OF INVENTOR 209
DATE	DATE	DATE
SIGNATURE OF INVENTOR 210	SIGNATURE OF INVENTOR 211	SIGNATURE OF INVENTOR 212
DATE	DATE	DATE